Attachment 2

Fiscal Estimate Worksheet for the Non-agricultural Performance Standards

October, 2001

SUMMARY OF COSTS AND COST ALLOCATION

The non-agricultural performance standards are divided into four major categories:
1. construction site erosion control for new development and redevelopment;
2. post-construction storm water runoff control for new development and redevelopment;
3. storm water runoff control for developed urban areas and,
4. storm water runoff control for transportation facilities.

This worksheet presents estimated costs to implement the first three categories of performance standards. The assumptions used to develop the costs are also presented. Where possible, the costs are represented as statewide costs. The cost of implementing the fourth category, transportation facilities, is not included in the estimate at this time. It is our understanding that the Department of Transportation is working on these cost estimates and we are looking to them to provide a fiscal estimate for the transportation facilities.

The estimated annual costs for implementing these three categories of non-agricultural performance standards are summarized in Table 1. Annual costs are broken down into three time periods to reflect how implementation of the proposed performance standards will be phased in over time. The table assumes the following:

- During the time period 2002 - 2007, performance standards for construction and post-construction will be met on 100% of the sites, the performance standards for Information & Education and Stage I requirements will be met on 50% of the sites, and the performance standards for Stage 2 requirements will be met on 10% of the sites.

- During the time period 2008 - 2012, performance standards for construction and post-construction, Information & Education and Stage I requirements will be met on 100% of the sites, and the performance standards for Stage 2 requirements will be met on 50% of the sites.

- During the time period 2013 and beyond, all performance standards will be fully implemented.

Table 1. Estimated total annual cost to comply with non-agricultural performance standards in proposed NR 151.

Performance Standard Category	Estimated Annual Cost During Time Period		
	2002 - 2007	2008 - 2012	2013-
Category 1. Construction Sites	$0.6 - 1.8 million	$0.6 - 1.8 million	$0.6 - 1.8 million
Category 2. Post-construction Sites			
a. Solids, Peak Shaving,	$17-19 million	$17-19 million	$17-19 million
Infiltration			
b. Buffer Areas	See narrative	See narrative	See narrative
c. Vehicle Fueling	See narrative	See narrative	See narrative
Category 3. Developed Urban Areas			
a. I&E Requirements	$2 million	$4 million	$4 million
b. Stage I Requirements, Residential	$0.8 million	$1.7 million	$1.7 million
c. Stage I Requirements, Commercial	$1.7 million	$3.3 million	$3.3 million
d. Stage I Requirements, Industrial	$0.3 million	$0.6 million	$0.6 million
e. Stage II Requirements, Residential	$0.2 million	$1.2 million	$2.4 million
f. Stage II Requirements, Commercial	$5.1 million	$25.5 million	$51 million
g. Stage II Requirements, Industrial	$1.0 million	$4.8 million	$9.6 million
Total Annual Cost During Time Period	$28.7 - 31.9 million	$58.7 - 61.9 million	$90.2 - 96.4 million

Cost Allocation and State Cost Assistance Programs

The performance standards must be met regardless of the availability of state cost-share funds. However, there are two financial assistance programs that local units of government may use to help defray costs incurred in meeting these performance standards. These programs are the Urban Nonpoint Source and Storm Water Management Grant Program, authorized under s. 281.66, Stats., and the Clean Water Revolving Loan Program, administered under chapter NR 162, Wis. Admin. Code. The Targeted Runoff Management (TRM) Grant Program is not relevant here because there is currently no general program revenue or segregated funds budgeted under that program that could be used towards the I&E requirements, and because the remaining *Category 3* requirements under NR 151 only apply to permitted municipalities, which are restricted by statute from getting TRM funds.

Table 2 summarizes the performance categories eligible for financial assistance under these programs. General eligibility can be summarized as follows:

- *Category 1.* This category is not eligible for assistance under either program.

- *Category 2*. This category is generally not eligible under either program. However, the local government may be able to secure a loan under special circumstances if the government owns and operates a regional storm water facility and has land use policies in place consistent with the new smart growth law. For general purposes, the cost-allocation will assume that local costs for activities under Category 2 will not be funded with grants or loans.
- *Category 3*. The Urban Nonpoint Source and Storm Water Management Grant Program can fund I&E requirements, but the Clean Water Revolving Loan Program cannot. However, the grant and loan programs have similar funding policies for other activities in this category. These programs can fund general municipal storm water management programs to control runoff from residential, commercial, government/institutional, transportation and recreational land uses, but cannot fund runoff controls for privately owned industrial development.

Table 2. Fundable activity under the Urban Nonpoint Source and Storm Water Management Grant Program and Under the Clean water Revolving Loan Program.

Performance Standard Category	Eligibility	
	Grants	Loans
Category 1. Construction Sites	N	N
Category 2. Post-construction Sites		
a. Solids, Peak Shaving,	N	N
Infiltration	N	N
b. Buffer Areas	N	N
c. Vehicle Fueling	N	N
Category 3. Developed Urban Areas		
a. I&E Requirements	Y	N
b. Stage I Requirements, Residential	Y	Y
c. Stage I Requirements, Commercial	Y	Y
d. Stage I Requirements, Industrial	N	N
e. Stage II Requirements, Residential	Y	Y
f. Stage II Requirements, Commercial	Y	Y
g. Stage II Requirements, Industrial	N	N

The allocation of costs between state and local funding sources depends on which costs are eligible for state cost sharing and the amount of funding the state actually makes available in its biennial budgets. Table 3 shows the cost allocation for those activities eligible for grants or loans. These include the following activities under *Category 3:*

- I&E Requirements
- Stage I Requirements for Residential and Commercial
- Stage II Requirements for Residential and Commercial.

The cost-allocations assume an annual appropriation for the Urban Nonpoint Source and Storm Water Management Grant Program of $6.5 million per year in bonding, $2 million per year in segregated funds, a maximum cost-share rate of 70% for I&E activities (*Category 3a*) and a

maximum cost-share rate of 50% for construction of best management practices (Categories 3b, 3c, 3e and 3f). The funding levels for grants are the amounts included in the Governor's budget for the 2001-2003 biennium. For loans, although they must be repaid, they do have a subsidy value. It is assumed that the annual loans under the Clean Water Revolving Loan Program will have a subsidy value equal to $3.6 million. The derivation of this figure is presented in Attachment A.

Table 3. Annual cost allocation for activities in Category 3 eligible for grants or loans

Activity	Time Period	Total Cost	State Share*		Local Share	
			Funding	%	Funding	%
I&E	2002 - 2007	$2 million	$1.4 million	70	$0.6 million	30
	2008 - 2012	$4 million	$2.0 million	50	$2.0 million	50
	2013 -	$4 million	$2.0 million	50	$2.0 million	50
Stage I & II						
Residential/commercial	2002 - 2007	$7.8 million	$3.9 million	50	$3.9 million	50
	2008 - 2012	$31.7 million	$10.1 million	32	$21.6 million	68
	2013 -	$58.4 million	$10.1 million	17	$48.3 million	83

* State funding assumes $2 million/year for I&E type activities and $10.1 million for BMP construction. The $10.1 million for BMP construction assumes $6.5 million in annual grants plus $3.6 million per year in grant-equivalent loan subsidies.

With a maximum state cost share rate of 70% for I&E activities, Table 3 shows that for the years 2002–2007 the annual state share for I&E type activities will be adequate. In subsequent years these costs will have risen and the state share will be only 50% of the need. This means that during these later time periods, the state will be unable to provide the 70% level of cost sharing allowable under the program. Unless state grant funds are sufficient, the program will either have to reduce cost share rates or deny cost share assistance to some applicants. A similar thing happens to permitted municipalities that must construct best management practices to meet Stage I and II controls in residential and commercial areas. During the early years, there will be enough state funds to provide cost-share equivalency of 50% (the maximum cost share rate). In fact, there will be an excess of $6.2 million, which can either be used by non-permitted municipalities to construct best management practices, or it can be carried over to later years when the $10.1 million available annually will provide only 17-32% of the funding needed. The ramifications for management of these funds is the same as previously mentioned.

One final important qualification needs to be mentioned here. Under current law, the state appropriation for urban storm water projects authorized under s. 281.66, Stats., has to be shared with municipal flood control and riparian restoration projects authorized under s. 281.665, Stats. While the department has requested these program elements be separated, if these programs remain combined, and if appropriations stay the same as in the 1999-2001 budget, the advent of the flood control projects would significantly reduce the amount of state share available for storm water projects.

ASSUMPTIONS AND CALCULATIONS

1. NR 151.11 Construction Site Performance Standard

Performance Standard

"Best management practices, by design, shall reduce sediment carried in runoff…to the maximum extent practicable. The goal is to develop and implement BMPs that, by design, reduce the average annual sediment load carried in runoff by 80% as compared to no sediment or erosion controls…".

Annualized Cost

The annualized cost is estimated to be in the range of $0.6 - $1.8 million.

Annualized Cost Calculations and Assumptions

Calculations. The following calculations were used in developing the estimated costs. The numbers in brackets refer to the applicable assumptions from the list below.

The annual erosion control costs attributed to meeting this performance standard are limited to those required to meet the 80% sediment control standard on sites from 1 to 5 acres of land disturbing construction activity [1,2]. Using an estimated 10,000 acres of land under urban development per year [3] of which 19.4% is between 1 and 5 acres [4], the estimated number of acres of construction affected by these performance standards equals 1,940 acres per year. In addition, the applicability includes grading of more than 10,000 square feet near navigable waters. The acreage of development annually in the shoreland area that falls between 10,000 sq. ft. and 1 acre is about 100 acres [5]. The per acre cost to implement construction site erosion control on these sites is best represented by the information from Dane County, Wisconsin ($300-900/acre) [6]. Therefore, the annual cost to implement the rule on smaller construction sites will be: (10,000 acres x 19.4%) + 100 acres = 2,040 acres.

2,040 acres x $300 = $0.6 million
2,040 acres x $900 = $1.8 million

Assumptions. The following assumptions were made in developing these costs.

1. Until March 10, 2003, the performance standard will only apply to sites over 5 acres except where there is grading more than 10,000 sq. ft. near a navigable water, in which case the standard would apply. After March 10, 2003, the standard will apply to sites over 1 acre. This will keep the program compliant with recently enacted federal storm water regulations. Only the costs of controlling erosion on construction sites between 1 and 5 acres and sites over 10,000 sq. ft. in the shoreland area have been included in this fiscal estimate, since costs for the sites over 5 acres are properly attributed to existing NR 216, not proposed NR 151. This performance standard can be attained through implementation of existing technical standards, which are required under current regulation (see #2 below).
2. Construction sites over 5 acres are currently permitted under chapter NR 216. Sites are to be managed in accordance with the Wisconsin Construction Site Best Management Practice Handbook (Pub. WR-222 93 Rev.). It is assumed that the existing requirements under NR

216 will comply with the performance standards. The handbook provides for both sediment and erosion control practices. Currently design engineers are relying on sediment control practices, which may not achieve the 80% goal alone. Silt fences are capable of removing 30-50% of the sediment load. Sediment traps and basins are in the 50-70% range. Efficiency is dependent on the soils reaching the sediment control structure. Sandy soils settle faster and result in higher removal rates than clay soils. The 80% goal will encourage design engineers to use more erosion control practices along with the sediment control structures. Erosion control practices such as temporary seeding, seed and mulch, matting, and polymers are 80-95% effective in keeping the soil in place and not allowing it to move off-site. Dane County has implemented an ordinance that directs the permit applicant to use more erosion control practices and phasing of the project rather than sediment control alone. They estimate the cost for construction sites to comply with their ordinance is less than 1% of the cost of the development project.

3. The number of residential structures under construction every year in Wisconsin was estimated based on US Census Bureau statistics on dwelling unit authorizations (permits to construct) and dwellings per structure (such as 1 or 2 or more families/unit). An estimated lot size was assigned for each type of structure, and multiplied by the estimated number of structures to estimate the total number of residential acres developed per year. Since "other" urban land covers such as commercial and industrial will also be developing, two methods were used to estimate the projected increase in non-residential urban land uses. In method one, the portion of all urban land use that is residential was obtained for southeastern Wisconsin from the Southeastern Wisconsin Regional Planning Commission land use projections for 1990-2020. In method two, Wisconsin Department of Revenue Assessment Class Information for 1990-1998 was evaluated to determine the mix of different urban land covers. This information on the relative amounts of urban land covers was used, along with the previously calculated estimate of residential land cover, to calculate the number of acres of "other urban" land cover. The residential class and "other urban" class were added together to obtain a total. The total acres of projected development, per year, statewide, is 8,000 acres of residential land and 2,000 acres of other urban land covers, for an estimated total of 10,000 acres per year.
4. The US EPA prepared a fiscal analysis concerning the impact of a change in the applicability of the regulatory construction site erosion control standard from 5 acres to 1 acre as required under federal Phase II storm water regulations. In this analysis, EPA estimates that 78.1% of all disturbed area nationwide involves projects greater than 5 acres and 97.5% involve projects greater than one acre. Based on these numbers, it is estimated that 19.4% of all construction occurs on sites between 1 and 5 acres.
5. The number of acres of land disturbing activity due to grading of more than 10,000 sq. ft. and up to 1 acre was estimated from regional DNR staff receiving requests for construction under the Ch. 30 permit process. They estimate that 100 acres are disturbed in this category annually. This amount was included in the estimate of the total acreage needing controls to meet the performance standard.
6. Dane County, Wisconsin has a construction erosion control performance standard of 7.5 tons/acre/year, which is approximately an 80% level of sediment control. The county estimates that the cost of meeting this standard is in the range of $300-$900/acre for sites between 1 and 5 acres. The county emphasizes the use of construction phasing and the application of seed and mulch in favor of construction of BMPs such as sediment ponds and silt fences.

2a. NR 151.12(4, 5, and 6) Post-Construction Performance Standards

Performance Standard

The BMPs shall be designed, installed or applied and maintained… to:…

a) for new development, reduce the average annual total suspended solids load by 80% as compared to no controls.

b) for redevelopment, reduce the average annual total suspended solids load by 40% as compared to no controls

c) maintain or reduce the peak runoff discharge rates, to the maximum extent practicable, as compared to pre-development conditions for the 2-year, 24-hour design storm.

d) *infiltrate initial runoff from the site (as prescribed), except in areas excluded by the code.*

Annualized Cost

The annualized cost is estimated to be in the range of $36-43 million.

Annualized Cost Calculations and Assumptions

Calculations. The following calculations were used in developing the estimated costs. The numbers in brackets refer to the applicable assumption from the list below.

In a survey of municipalities in the southeast and southern part of the state, many of them already require, through ordinance, control of the 100-year storm event or smaller design storms (peak shaving). This requires the developer to dedicate a portion of the site to the construction of a peak shaving device (typically a dry pond). However, in other areas of the state this may not be the case, in which case a developer would be allowed to develop a site without any storm water controls. The table in Attachment B reflects those two types of situations and the additional cost to the developer to meet the performance standards.

Assumptions. The following assumptions were made in developing these costs.

1. The same area set aside for peak shaving can be used to meet the wet detention basin requirement. The two performance standards complement each other.
2. To construct a peak shaving (dry) pond, the developer needs to set aside 2.5-3.0% of the land for medium density development. The same excavation cost as that typically assumed for wet detention ponds ($70,000/surface acre of pond) will be used. (Personal correspondence: Greg Fries, City of Madison).
3. Statewide projections of urban land growth are based on information about urban growth contained in SEWRPC projections. Based on relationships in the SEWRPC data, it is estimated that 90% of the 8,000 acres of residential development statewide, or 7,200 acres/year, will be low and medium density. Ten percent of the 8,000 acres, or 800 acres/year, will be high density development. The remaining projected development, or 2,000 acres/year, is projected to be commercial and industrial. This means that 7,200 acres of development per year statewide is estimated to be low and medium density residential and 2,800 acres of development statewide is estimated to be commercial, industrial and higher density residential.
4. Wet detention basins can be consistently designed to meet the 80% sediment reduction goal. Based on the Standards Oversight Council Technical Standard No. 1001, the following area needs to be set aside for the construction of wet detention ponds:

- For low to medium density residential development, 1% of the 7,200 acres of land area converted to this land cover is needed for detention ponds.
- For commercial, industrial and the remaining higher density residential development (estimated to be a total of 2,800 acres/year), the developer would need to set aside for detention 2-2.4% of the estimated 2,800 acres/year converted to this land cover.

5. The number of acres statewide that would need to meet these performance standards is the same as all the acres identified above needing construction site erosion control, including those over 5 acres. This includes 8,000 acres residential and 2,000 acres "other" per year.
6. The cost to construct a wet detention basin is about $70,000/surface acre of detention, including excavation and outlet structures. (Source: Costs of Urban Nonpoint Source Water Pollution Control Measures. Southeastern Wisconsin Regional Planning Commission Technical Report No. 31)
7. Annual operation and maintenance costs are estimated to be 5% of the capital cost.
8. The performance standard for infiltration was developed using SLAMM model outputs for development sites under varying soil types. The input to the use the 1 % infiltration performance standard cap for residential and the 2% cap for commercial development.
9. Since all soils are not suitable for infiltration, the infiltration costs were adjusted to reflect the fact that some new development will be exempt from meeting the infiltration standards. To calculate what this effect might be on a statewide basis, USDA-NRCS county soil survey data was used to estimate the percent of each county suitable for infiltration. Each county percentage was then weighted in proportion to the amount of population growth projected for the county through calendar year 2020. (Source: Total county population projections for 1990-2020, developed by the Demographic Services Center of the Wis. DOA in accordance with s. 16.96 Stats.) This was done to reflect the assumption that the soils based limitations on statewide infiltration are most significant in those areas where population growth and, by inference, new development, is projected to occur. A statewide average was then calculated based on the weighted county numbers. In performing these calculations, population increase data for Milwaukee County were not used as there is little corresponding land for new development in that county. Given the exclusions to the infiltration performance standards based on shallow depth to groundwater and bedrock and "tight" hydrologic soils group, 50% of the state does not have soils suitable for infiltration.
10. Infiltration basins have a capital cost of $94,000-$120,000/acre of basin. (Source: Costs of Urban Nonpoint Source Water Pollution Control Measures. Southeastern Wisconsin Regional Planning Commission Technical Report No. 31).
11. Land costs to the developer for new development are estimated at $7,000/acre if it is purchased as rural land. This estimate is based on 1999 figures for cost per acre for agricultural land being diverted to other land uses from DATCP agricultural statistics. The cost was calculated for 13 counties in the state, which represent 75% of the growth in the state based on DOA demographic survey. The cost was weighted based on the growth rate in the county.

Conservation Design

An alternative to meeting each of the performance standards separately is to combine them in what has been termed "conservation design." This approach reduces the impervious surface area when compared to a traditional site layout by using such techniques as narrower streets, grassed swales (instead of storm sewers) and cluster development patterns which leave larger areas in natural vegetation. Consequently, the amount of runoff from impervious surfaces is reduced.

Attachment C and D include several examples showing how conservation design approaches can reduce the cost of development and increase the marketability and profitability of the real estate.

2b. NR 151.12(7) Riparian Area Performance Standard

Performance Standard

If construction occurs within a buffer area, permanent vegetative cover shall be established and maintained throughout the length of the buffer area in which the construction is located… The requirements of this paragraph shall be met to the maximum extent practicable.

Annualized Cost

The department does not have adequate information to develop a statewide cost estimate because it does not have data on the number of developments that would be impacted, nor on the net economic impact that would occur at each development given the economics of "green" development practices, such as those discussed in Attachment C[1,2,3].

Assumptions

The following assumptions would apply to a cost calculation made for a specific site.

1. The minimum width varies with the water resource it is intended to protect.
2. The cost to vegetate and prepare an area as a buffer is $0-300/acre. An area does not have to be seeded if it is currently vegetated and the development does not disturb the vegetation.
3. The primary cost for this practice is the loss to the developer of land that would have sold as lots. If 1/3-acre lots sell for $50,000, as in the proposed Village of Cross Plains subdivision example, then not allowing development in the area closest to the stream results in the developer losing this revenue. However, the economics of conservation design presented in Attachment D can partially, or even fully, offset the impacts of not being able to develop within the buffer area.

2c. NR 151.12(8) Gas Stations and Vehicle Maintenance Areas Performance Standard

Performance Standard

Fueling and vehicle maintenance areas shall, to the maximum extent practicable, have BMPs designed, installed or applied and maintained to reduce petroleum within runoff, such that the runoff that enters waters of the state contains no visible petroleum sheen.

Annualized Cost

The department does not have adequate information to develop a statewide cost estimate, although the additional cost to meet these performance standards is expected to be minimal when compared to preventive measures already common in the industry [1,2,3]. Using the assumptions identified below for use of preventive and treatment practices, the annual cost may be $150,000.

Assumptions

The following assumptions would apply to a cost calculation made for a specific site.

1. It is believed that gas stations and maintenance areas will elect to implement BMPs that prevent storm water contamination as opposed to BMPs that treat contaminated storm water since they typically are much less expensive and are usually more effective. Many facilities already implement these BMPs (see assumptions 2 and 3) so incrementally it will be less or may require nothing extra to meet this standard.
2. Currently, there are no state or federal requirements for implementing best management practices at gas stations. Only certain industrial vehicle maintenance areas that are covered under an industrial storm water permit (NR 216) are required to implement storm water BMPs. However, there are certain common practices that gas stations implement that help to minimize petroleum contamination of storm water. New gas stations typically implement some of the following practices: construct a canopy over fueling area; direct canopy runoff away from fueling area; grade the area to prevent runoff from entering the fueling area; install vacuums on pump nozzles to prevent liquid and vapor gas loss; erect "Do not top-off fuel tank" signs; have petroleum absorbents immediately available to clean-up spills and train employees on appropriate spill management. Most gas stations follow only some of these practices, but they should implement most if not all of them. Implementing these preventative measures, as best as practical, would meet this proposed standard.
3. The canopy is a relatively expensive practice that is already constructed over nearly all retail fueling areas for customer comfort reasons. Redesigning and implementing the other practices would have a minimal cost associated with them and some are already in practice. Therefore, meeting the performance standard would have minimal capital costs for practices such as redirecting canopy downspouts away from the fueling area instead of discharging on to the fueling area or erecting signs. Operation and maintenance costs would be as low as the cost to purchase and dispose of petroleum absorbent material. If 100 new stations per year were to implement preventive measures at an average cost of $500 per station, then the annual cost would be $50,000.
4. BMPs that prevent storm water contamination are recommended before treatment devices. An oil and water separator is a BMP that treats petroleum-contaminated runoff. An oil/water separator is an expensive device that could cost $20,000 or more depending on the rate of runoff treated by the device (this does not include additional maintenance costs). An oil and water separator may be used, but is <u>not</u> required. If 5 fueling and maintenance areas per year were to implement this practice the annual cost would be $100,000.

3a. NR 151.13(4) Developed Urban Area Performance Standards, I & E Requirements

Performance Standard

All of the following shall be implemented by March 10, 2008:

(a) Public education program and corresponding municipal activities for leaf management and collection and proper disposal of grass clippings. Public education program, utilizing information and education materials provided by the department, for proper use of lawn and garden fertilizers and pesticides, managing pet wastes and preventing dumping of oil and other chemicals in storm sewers.
(b) Lawn and garden fertilizers and pesticides used on municipally controlled properties, with pervious area over 5 acres shall include application of fertilizer based on soil test results and use of pesticides in accordance with an integrated pest management plan.
(c) Detection and elimination of illicit discharges to storm sewers.

Annualized Cost

The total estimated statewide administrative cost is $4 million per year.

Annualized Cost Calculations and Assumptions

Calculations. The following calculations were used in developing the estimated costs. The numbers in brackets refer to the applicable assumption from the list below.

The total statewide administrative cost assumes 448,000 households and a per-household cost (as indicated by EPA) of $8.90 [1,2]. The total estimated statewide administrative cost is then $4.0 million per year. This reflects the administrative cost to incorporated municipalities to complete tasks such as "good housekeeping", information and education, construction site erosion control enforcement and storm water management.

Assumptions. The following assumptions were made in developing these costs.

1. The number of urban households in incorporated municipalities (cities and villages) was calculated using the population of the state (from 1990 decennial census made by the United States census, divided by 2.6 (persons per household). Based on 1990 population estimates for Wisconsin incorporated municipalities, the estimated number of households to be used in the cost calculation is 448,000. The populations in areas under 1,000 people per square mile and in municipalities required to obtain NR 216 permits for municipal stormwater discharges were not included in the calculations. Any permitted municipality under NR 216 has already met equivalent standards. (Madison and Milwaukee have been under permit for up to 5 years). Approximately 60 other municipalities will receive permits under the current NR 216 storm water rules and they will also have to meet standards equivalent to these, whether the performance standards become rule or not.
2. The fiscal estimate will reflect administrative costs to the municipality. Administrative costs have been developed by EPA for the implementation of the Phase II requirements, and these costs are very similar to the I & E performance standards. The EPA costs are calculated on a per household basis.

NR 151.13(5) Developed Urban Area Performance Standards, Stage 1 Requirements

Performance Standard

Municipalities subject to subch. I of ch. 216 shall implement all of the following by March 10, 2008:

(a) All of the requirements contained in sub. NR 151.13 (4).
(b) A 20% reduction in total suspended solids that enter waters of the state as compared to no controls.

Note: It is expected that the municipality will be able to achieve the 20% reduction by municipal street sweeping, using either conventional or high efficiency sweepers, annual catch basin cleaning and de-icer management.

Annualized Cost

The cost to implement Stage 1 requirements is estimated to be $5.7 million

Annualized Cost Calculations and Assumptions

Calculations. The following calculations were used in developing the estimated costs. The numbers in brackets refer to the applicable assumption from the list below.

Total costs were calculated by estimating the number of acres needing management and multiplying the acreage by a unit treatment cost per acre. Two different unit costs were calculated, one for the lower density development class, such as residential, and a separate one for the higher density development class, such as commercial and industrial. This distinction was made because costs to manage storm water on the higher density class land uses are significantly higher than for the lower density land use class [1].

The total number of urban acres was calculated from the Wisconsin Land Survey data base [2]. This data base identified minor civil divisions (cities, villages, towns) from which were selected the communities identified by EPA as Phase II communities, minus those communities already designated under Phase I storm water rules [2,3]. The Phase I communities were not considered because these communities are already required to meet this level of control under current NR 216 regulations. The total urban acreage was partitioned into two density classes based on the mix of urban land uses present in southeastern Wisconsin as documented in SEWRPC Report #45. One density class includes residential/recreational lands and the other density class includes commercial/industrial/high density residential/institutional lands. These two major categories will be called "residential" and "commercial" for purposes of this analysis, even though the other appropriate land uses are included. The transportation component contained in SEWRPC Report #45 was re-distributed into each density class based on information contained in *Sources of Pollution in Wisconsin Storm Water,* by Bannerman, et al.

The resulting number of acres of residential development that must meet the requirements as a result of chapter NR 151 is 75,300 and the number for commercial development that must meet these requirements is 46,200 acres [2]. Using 75,300 acres of residential area times the $22/acre cost to meet Stage 1, the total cost is $1.7 million. Using a 46,200-acre figure for commercial, times the $86/acre cost for Stage 1, the total is $4.0 million. The overall total for Phase II permitted municipalities to meet the BMP portion of the Stage 1 requirements is $5.7 million [4.].

Assumptions. The following assumptions were made in developing these costs.

1. Street sweeping, catch basin cleaning and de-icing management is expected to result in a 20% reduction of total suspended solids. The cost to meet a goal of 20% reduction of total suspended solids was based on stormwater runoff management modeling. Different BMPs were assessed using the SLAMM model on representative residential and commercial sites. The mix of BMPs was developed by the work group convened by the department to help develop the urban performance standards. The model runs showed that residential areas can meet the performance standard using a combination of mechanical sweeping, catch basin cleaning, construction of new catch basins or wet ponds. The source for the cost of these practices was taken from SEWRPC, 1991. The cost to meet 20% control was based on the average cost of the practices identified above and is **$22/acre**. The model showed that commercial areas can meet the performance standard using mechanical sweeping or BMP construction for an average cost of **$86/acre**. Cost estimates were taken from SEWRPC, 1991. Costs associated with construction of devices included capital and operation and maintenance costs and were annualized based on a 20-year life expectancy for these practices.

2. The number of urban acres affected was derived from information on minor civil divisions from the Wisconsin Land Survey (satellite data). The areas were further divided up by impervious class. The area with <50% imperviousness was defined as residential. The area with >50% imperviousness was further divided to reflect a mix of urban land uses based on data from SEWRPC Report #45. The transportation component was re-distributed to other urban land uses as part of the partitioning. The redistribution is based on Bannerman's report (Sources of Pollutants in Wis. Stormwater). The residential fraction includes recreational acres and the commercial areas include industrial, institutional and high density residential as well. The resulting breakout was 75,300 acres of residential land use and 46,200 acres of commercial.
3. This standard applies to permitted municipalities under NR 216 which would include Phase I and Phase II municipalities. However, any permitted municipality under Phase I NR 216 is already required to meet equivalent standards and so those costs are not attributed to NR 151. Madison and Milwaukee have been under permit for up to 5 years. Approximately 60 other municipalities will receive permits under the current NR 216 storm water rules and they will also have to meet standards equivalent to these, whether the performance standards become rule or not. Consequently, these Phase I communities will not be included here.
4. The cost of Phase II incorporated municipalities meeting the I & E requirements contained in NR 151.13(4) was factored in under 3a. of the fiscal estimate and was not repeated here.

3b. NR 151.13(6) Developed Urban Area Performance Standards, Stage 2 Requirements

Performance Standard

The municipalities subject to subch. I of ch. NR 216 shall implement no later than March 10, 2013 a 40% reduction in total suspended solids that enter waters of the state as compared to no controls.
Note: It is expected that the municipality will be able to achieve the 40% reduction through the use of high efficiency street sweeping or structural BMP retrofit practices. The Stage 2 requirements may include application of BMPs to privately owned lands, such as shopping centers.

Annualized Cost

The cost to implement Stage 2 requirements is estimated to be $63 million.

Annualized Cost Calculations and Assumptions

Calculations. The following calculations were used in developing the estimated costs. The numbers in brackets refer to the applicable assumption from the list below. There are no calculations for administrative costs to meet Stage 2 of the standard because this would be ongoing from Stage 1.

Communities under Stage 1 will have already met the 20% reduction level. Since the cost estimates for practices are based on meeting a 40% level of control, it was assumed that the number of acres needing treatment would be cut in half for communities that had already met Stage 1[1]. Also, the area under consideration is now all the urban area from Phase I and II communities, since Phase I communities have not previously been asked to meet this higher level of control [1]. The total urban area is divided up by residential and commercial land use classes, as in the calculations for Stage I controls, because unit treatment costs are different for these land use types [1].

The area for residential is 216,500 acres[2]. Half of this area (108,250 acres) times the incremental cost of $22/acre gives a total of $2.4 million. The area for commercial land use is 132,700 acres [2]. Half of this area (66,350 acres) times the incremental cost of $914/acre gives a total of $60.6 million. The total annual cost for Stage 2 equals $63 million[3].

Assumptions. The following assumptions were made in developing these costs.

1. All permitted municipalities will be affected by this performance standard. A residential area would likely use a high efficiency sweeper to meet this 40% goal. The cost for a high efficiency sweeper was obtained from the manufacturer for Envirowhirl. At a **per acre cost of $22** for 40% control, a municipality would only use it on half the area to achieve the additional 20% reduction. In a commercial area, sweeping isn't as effective an option and some sort of device such as Stormceptor, Multi-Chambered Treatment Tank, Stormtreat, etc. may be needed. The manufacturers of these devices provided the cost estimate for their products and these costs were averaged to develop an approximate cost of **$914/acre** of area treated to achieve the goal of 40% control. This cost has been annualized assuming a 20-year life span for these practices and includes operation and maintenance costs. Only half of the area would need to be treated to meet the 20% incremental increase if 20% control is already being achieved under Stage 1.
2. The number of urban acres affected was derived from information on minor civil divisions from the Wisconsin Land Survey (satellite data). The areas were further divided up by impervious class. The area with <50% imperviousness was defined as residential. The area with >50% imperviousness was further divided to reflect a mix of urban land uses based on data from SEWRPC Report #45. The transportation component was re-distributed to other urban land uses as part of the partitioning. The redistribution is based on Bannerman's report (Sources of Pollutants in Wis. Stormwater). The residential fraction includes recreational acres and the commercial areas include industrial, institutional and high density residential as well. Adding the areas of Phase I and II communities results in a residential area of 216,500 acres and 132,700 acres of commercial land use.
3. The administrative costs will be the same as in Stage 1 and will not be repeated here.

Attachment A

Subsidy Equivalency of the Clean Water Fund Loan Program

For this analysis, the subsidy for the loan program was calculated at $3.6 million based on the following assumptions:

- Assume that the federal capitalization grants to Wisconsin are no longer being made (EPA intends on phasing them out) and that the state is not providing any additional funds either. This means that the sole source of funds will be loan repayments.
- Assume that EPA has capitalized the program nationally so that loan repayments nationally are $2 billion/year. This assumption is based on a June 5, 1997 memorandum from US EPA concerning proposed capitalization levels for the Clean Water State Revolving Funds.
- Assume the portion of the national revolving funds available to Wisconsin is equivalent to the portion of the national capitalization grants that Wisconsin has received. This portion is actually encoded in the Clean Water Act and is .027342. This means that on an annual basis we would have .027342 x $2 billion. This comes to $55 million per year for Wisconsin.
- Assume that in the heat of competition, loans for each of the key types of projects (wastewater vs storm water) will be made in proportion to the competitive pressure of each.
    - Assume that the past trends for wastewater grants will continue. This has been about $125 million/year.
    - Assume the storm water applications will be equal to the cost of stage I and stage II municipal needs we developed in our estimate, at full implementation. This is $69 million.
    - This means that we would use 69/(125+69) or 36% of the loans for storm water projects. This comes to .36 x 55 million = $20 million.
- If the state market loan rate is 7% and the storm water project rate is 65% of market, then the loan interest rate would be 4.55%. This is equivalent to a state subsidy of 18.2%, based on a present value subsidy chart prepared by the Bureau of Community Financial Management.
- The annual value of the state subsidy is .182 x 20 million = 3.6 million.

Attachment B

Cost Estimates for Post-Construction Best Management Practices

Best Management Practice	Municipality Without Existing Ordinance	Municipality With Existing Ordinance
Wet Detention & Peak Flow Shaving Pond [1,5] *This includes the portion of the pond to control water quality and the freeboard storage needed to shave peak flows.*	• Res. (1% x 7,200 acres) = 72 acres for pond. [3,4] • Com. (2.5% x 2,800 acres) = 70 acres for pond. [3,4] • Res. (72) x ($70,000/acre) = $5 million total capital cost for peak shaving and water quality [6] • Com.(70) x ($70,000/acre) = $5 million total capital cost for peak shaving and water quality [6] • Annual O&M cost @ 5% of capital cost = $0.5 million for res. and other land uses. [7] • Total annual capital and O&M = $10.5 million	• No additional cost for water quality because the site already had to set aside (2.5-3%) of the development area for the peak shaving pond. [2,5]
Infiltration basin	• (1%) x (7,200 acres)=72 acres for residential land use [3,8] • (72 acres) x (0.50) x ($94,000 - 121,000/acre) = $3.4-4.4 million for res. land uses)[9,10] • (2%) x (2,800 acres) = 56 acres for other land uses [3,8] • (56 acres) x (0.50) x ($94,000 - 121,000/acre) = $2.6-3.4 million for other land uses [9,10] • $6-8 million total capital	• Average of $4 million for residential land uses • Average of $3 million for other land uses.

Infiltration (continued)	cost for all land uses • Annual O&M cost @ 5% of capital cost = $0.3-0.4 million for res. and other land uses.[7] • Total annual capital and O&M = $6.3-8.4 million	• Annual O&M cost @ 5% of capital cost = $0.35 million. • Total annual capital and O&M = $7.4 million
Land needed for the BMP	• ($7,000/acre) x (36 acres residential) = $0..25 million for Res. [11] • ($7,000/acre) x (28 acres other land uses) = $0.2 million [11] • $0.45 million total for all land uses	• The land needed for the infiltration device is added in here. (36 acres for res.; 28 for others or $.45 M)
Total	• $17-19 million annual capital and O&M cost for all land uses (includes peak shaving, infiltration basin and the land needed for the BMPs)	• $18 million annual capital and O&M cost for all land uses (includes infiltration and the land needed for the BMP)

Attachment C

Conservation Design

Wisconsin Example**.**

A proposed development site in the Village of Cross Plains, Wisconsin was converted from a traditional development to a conservation design site. Instead of constructing a dry pond to control flows from the 100-year storm as required by local ordinance, the developer used conservation design techniques along with a small wet detention basin and infiltration basin. The site was still able to meet the peak flow shaving requirement for the 100-year storm in that same space. Because of the increased infiltration that will occur in the grassed swales and in the areas left undisturbed, the flows to the pond will be less and the pond was downsized accordingly. With the inclusion of an infiltration basin prior to discharge from the site, very little runoff is expected to leave the area of development. In addition, the developer was able to save on infrastructure costs due to smaller roads and the decreased need for traditional storm sewer piping. While we do not have detailed cost figures for the Cross Plains site, we do have information from national sites that verify the cost savings.

National Example.

Pre-Development:
This case study is in Kent County, DE on an 85-acre farm. This farm had not cropped a 35-acre area of woodland/wetlands to the north where a stream flowed along the edge of the property. The remaining 50 acres are Hydrologic Soil Group B soils. Drainage is to the stream in the north.

Conventional Design:
The plan was to provide residential development in a grid system, using 28-foot wide streets and curb and gutter. Ninety lots will be constructed in the 50-acre area. Storm water will drain to three detention ponds designed to control the peak of a 10-year storm prior to discharge to the stream. The woodland/wetland area will not be disturbed. There is no other open space in the development, resulting in **26.2 percent of the total site in impervious coverage**.

Conservation Design:
On the same 85-acre site, the natural drainage swales will be used for storm water management practices and the woodland/wetlands will not be developed. Berms and reforestation of the natural drainage areas will provide detention of storm water. The same number of lots will be constructed, but they will be smaller in size (quarter acre lots rather than the close to half-acre lots in the conventional). Only 35 acres of the site will be used for residential lots. The average street width is 20 feet and the **total impervious area is now down to 10.7 percent**. The runoff volume from the conservation design is half the volume of the conventional development.

Costs:

Conventional Development

6,800 ft. of streets	@$150/linear ft.	$1,020,000
3 detention ponds	@$16,000/pond	$48,000
7,400 ft. of storm water pipe	@ $22/linear ft.	$16,800
41 endwalls/inlets	@$1,300/each	$53,300
	TOTAL	**$1,284,100**

Conservation Development

4,000 ft. of streets	@$100/linear ft.	$400,000
1,500 ft. of streets	@85/linear ft.	$127,500
4,000 ft. of storm water pipe	@$22/linear ft.	$88,000
22 endwalls/inlets	@$1,300/each	$28,600
1,900 ft. of berms	@$10/linear ft.	$19,000
3,900 ft. of swales	@$4.50/linear ft.	$17,550
16.2 ac reforestation	@$2,925/ac.	$47,385
	TOTAL	**$728,035**

Other case studies have shown similar savings on the order of **40-60% reduction in cost** between the conservation design and the conventional development.

Source: Conservation Design for Stormwater Management, A Design Approach to Reduce Stormwater Impacts from Land Development and Achieve Multiple Objectives Related to Land Use. A Joint Effort Between the Delaware DNREC and the Environmental Management Center of the Brandywine Conservancy. September, 1997.

Attachment D

Economic Benefits of Storm Water Management Controls

Conservation designs, which minimize land disturbance and retain as much of the site's pre-development infiltration and retention capacity as possible, can reduce commercial and residential development and infrastructure costs as shown in *Attachment C.* Construction and post-construction storm water management controls have also been shown to increase the marketability and value of real estate. Taken together, these economic factors can greatly reduce the cost of implementing storm water performance standards and turn a perceived cost-burden into an amenity for the developer and homeowner. The purpose of *Attachment D* is to present case histories illustrating how sound storm water management has positively impacted the marketability of residential and commercial real estate.

The US EPA has conducted a survey of commercial and residential (homes and apartments) development projects nationwide to examine the impacts of storm water ponds and constructed wetlands on property values (*US EPA, 1995*). The case studies examined situations where the storm water BMPs were properly designed, with aesthetic and recreational amenities, and properly maintained. A summary of these studies is contained in Table 1. Based on these case histories, the report concluded that residential property values were increased by up to 28% by the amenities associated with the storm water practices and that the real estate bordering on the ponds and wetlands was generally purchased first. The impact on commercial real estate rental rates was not as dramatic due to other market factors, but other benefits were realized including lower vacancies and lower tenant turnover. The study also recognizes that poorly designed, poorly maintained or unsafe storm water BMPs can make real estate less desirable and may decrease property values.

Other information is available indicating the positive economic impacts of storm water management practices, including structural (ponds, wetlands) and non-structural (reducing overall site imperviousness) measures. For example:

- Economic surveys documented that conserving forests on residential and commercial sites can enhance property values 6 to 15% and increase sale rates (*Schueler, 1997*).
- Housing prices along a greenbelt in Colorado were found to be 32% higher and those adjacent to a greenway park in Philadelphia were found to be 33% higher than non-adjacent homes. In a national survey, 32 of 39 communities perceived buffers to have a positive or neutral impact on property values (*Schueler, 1997*).
- In Minnesota, sale prices were nearly 33% higher for homes having a view of a storm water wetland than those without such an association, an increase comparable to homes bordering on high quality urban lakes (*Schueler, 1997*).
- Alternative development practices including smaller lots, less roads and natural drainage have not hurt the developer of Prairie Crossing, a conservation design residential development. In fact, home sales are comparable to or better than conventional developments *(Natural Resources Defense Council, 1999*).

An interagency study conducted by Purdue University and soil conservation districts in Ohio and Indiana showed that property values reflect not only post-construction amenities, but also the status of the lots during construction (Herzog, et al., 2000). The survey found that lots where vegetation was maintained during construction were perceived to be more valuable than lots

graded bare during development. Realtors perceived the vegetated lots to be worth about $700 more than barren lots, and home buyers perceived the vegetated lots to be worth about $750 more. The difference perceived by developers was only $250, a difference that was not found to be statistically significant.

Table 1. Economic impacts on property values of storm water management measures (From *US EPA, 1995*)

Real Estate Type & Location	**Type of Storm Water BMP**	**Cost of Real Estate (Including Premium)**	**Increased Real Estate Market Premium Due to BMP**
Residential Home Lot: Illinois	Wet Pond	-	Residents believe adjacent lots worth 22% more.
Residential Home Lot: Colorado	Constructed Wetland	$134,000	30%
Residential Home Lot: Illinois	Wet Ponds/Stream Buffers	$299,000 - $374,900	10%
Residential Condo: Virginia	Wet Pond	$129,900 - $139,000	$7,500
Residential Rental: Florida	Wet Pond	$336 - $566/month	$15 - $35/month
Residential Home Lot: Kansas	Constructed Wetlands	$18,000 - $40,000	$21,000
Residential Townhouse: Virginia	Wet Pond	$100,000	$6,117
Residential Townhouse: Virginia	Wet Pond	$436,667	$17,467
Residential Homes: Virginia	Wet Pond		10% - 20%
Commercial Rental: Maryland	Wet Pond		$100 - $200/month
Commercial Rental: Maryland	Wet Pond	$17.50 - $20.50/sq. ft.	$1 to $1.50/sq. ft.
Commercial Rental: Maryland	Wet Pond	$16/sq. ft.	$1/sq. ft.

US EPA, 1995. Economic benefits of runoff controls. 20 pages. EPA 841-S-95-002 *(also available at www.epa.gov/owow/nps/runoff.html*)
Schueler, 1997. *The economics of watershed protection*. Watershed Protection Techniques, Vol 2, No. 4, pages 469 - 481. The Center for Watershed Protection, publisher.
Natural Resources Defense Council, 1999. *Addressing stormwater in new development and redevelopment.* Stormwater strategies: community responses to runoff pollution, pages 224 - 225.
Herzog, Martha, et. al., 2000. *Are green lots worth more than brown lots? An economic incentive for erosion control on residential developments*. National Conference on Tools for Urban Water Resource Management & Protection, EPA/625/R-00/001, pages 564 - 577.